

**Methods and Apparatus for  
Improving the Quality of Speech Signals**

**ABSTRACT**

Methods and apparatus are disclosed to extend the bandwidth of a speech  
5 communication to yield a perceived higher quality speech communication for an enhanced  
user experience. In one aspect of the invention, for example, methods and apparatus can be  
used to extend the bandwidth of a speech communication beyond a band-limited region  
defined by the lowest limit and highest limit of the frequency spectrum by which such speech  
communication is otherwise characterized absent such bandwidth extension. In another  
10 aspect of the invention, for example, methods and apparatus can be used to substitute for  
corrupt, missing or lost components of a given speech communication, or to otherwise  
enhance the perceived quality of a speech communication, by extending the speech  
communication to include one or more artificially created points within the region defined by  
the lowest limit and highest limit of the frequency spectrum by which such speech  
15 communication is characterized. The result is a speech communication that is perceived to be  
of higher quality. The various aspects of the present invention can be applied, for example, to  
network devices or to end-terminal devices.